

CLAIMS:

1. **As part of a seeder** (i.e. apparatus capable of being advanced by drawing, self propulsion, carriage, pushing or otherwise) so as to lay multiple rows of sown seed into the ground in a single pass, **a seed deposition assembly** which comprises or includes

a disc having one side with at least some degree of concavity,

a hub or bearing ("hub") of or attaching to the disc at least primarily from the disc side with at least some degree of concavity, and

at least one of

- (v) a mount for the disc attaching to the hub from the other disc side so as to allow rotation relative to the mount,
- (vi) a swinging arm associated directly or indirectly with the hub from the other disc side so as to allow the raising and lowering of the disc rotational axis at least in part defined by the hub,
- (vii) a moulding or other member at least in part defining a seed deposition chute, said moulding or other member attaching to said hub from the other disc side (i.e. to that of the concavity), and
- (viii) a mount for the disc attaching to the hub from the other disc side as in (i), said mount being carried by a swinging arm.

2. **A seed deposition assembly suitable for a seeder** (i.e. apparatus capable of being advanced by drawing, self propulsion, carriage, pushing or otherwise) so as to lay multiple rows of sown seed into the ground in a single pass, which comprises or includes

a disc having one side with at least some degree of concavity,

a hub or bearing ("hub") of or attaching to the disc at least primarily from the disc side with at least some degree of concavity, and

at least one of

- (ix) a mount for the disc attaching to the hub from the other disc side so as to allow rotation relative to the mount,
- (x) a swinging arm associated directly or indirectly with the hub from the other disc side so as to allow the raising and lowering of the disc rotational axis at least in part defined by the hub,
- (xi) a moulding or other member at least in part defining a seed deposition chute, said moulding or other member attaching to said hub from the other disc side (i.e. to that of the concavity), and

- (xii) a mount for the disc attaching to the hub from the other disc side as in (i), said mount being carried by a swinging arm.

3. **A seed sowing assembly** (or components of such an assembly) **of a seeder**, the apparatus (being the components and/or the assembly) comprising or including
 - a disc having an inside and an outside,
 - a hub or bearing ("bearing") attached to the disc from or so as to be substantially on the inside thereof and substantially on or about the centre of the disc, and
 - a chute member or assembly (hereafter "mount") attached (by itself and/or other means) to the bearing from the outside of the disc, said mount preferably one or both having
 - (a) the chute it at least in part defines having an inlet to receive seeds to be sown above an outlet from which they are to drop, and/or
 - (b) a journalable seed inlet.
4. **A seed sowing assembly** (or components of such an assembly) **suitable for a seeder**, the apparatus (being the components and/or the assembly) comprising or including
 - a disc having an inside and an outside, ,
 - a hub or bearing ("bearing") attached to the disc from or so as to be substantially on the inside thereof and substantially on or about the centre of the disc, and
 - a chute member or assembly (hereafter "mount") attached (by itself and/or other means) to the bearing from the outside of the disc, said mount preferably one or both having
 - (a) the chute it at least in part defines having an inlet to receive seeds to be sown above an outlet from which they are to drop, and/or
 - (b) a journalable seed inlet.
5. An assembly of claim 3 or 4 wherein, in respect of the disc, the inside is concave and the outside is complementary.
6. An assembly of claim 3 wherein said mount is in turn attached or attachable to a trailing region of a swinging arm.
7. An assembly of claim 6 wherein said swinging arm is able to raise and lower the disc.
8. An assembly of claim 7 wherein means provides a bias on the swinging arm and thus through the mount and bearing into the disc to, (at least in use) provide a force to achieve ground penetration.
9. An assembly of claim 7 or 8 wherein said mount and swinging arm are adjustable as to relative disposition so as to enable adjustment of the angular presentation of the disc to the advance direction and/or the swinging arm.

10. An assembly of any one of claims 7 to 9 wherein the swinging arm is mounted so as to pivot at its advance direction transversely of the advance direction.
11. A seed drill having multiple seed deposition or seed sowing assemblies of any one of claims 1 to 10 in mirror imaged groupings for each transverse row or array.
12. A seed drill or seeder of a kind to deposit serial streams of seed each into a disc made trough, trench or the like in the ground *characterised in that* each disc has its bearing mounted to the disc from its inside (i.e. that side having a concavity) and the chute providing member or assembly down which the stream of seeds is to pass is attached to the bearing from the outside (i.e. the other side) of the disc.
13. A drill or seeder of claim 12 further characterised in that the chute providing member is attachable in a range of angular dispositions to a swinging arm or is attached in a chosen or mandatory angular disposition to a swinging arm.
14. Banks of trailing arms, each trailing arm carrying
 - a disc having some degree of concavity,
 - a bearing or hub to allow disc rotation at least largely located within the concavity of the disc, and
 - a mount from its swinging arm for the bearing or hub at least primarily from the other side of the disc.
15. Banks of claim 14 wherein said mount at least in part conforms to the shape of the disc.
16. Banks of claim 14 or 15 wherein said mount includes a seed deposition chute or at least part thereof.
17. Banks of any one of claims 14 to 16 wherein said mount is journaled both into the bearing and into the swinging arm, the journal axes being at least substantially normal with respect to each other.
18. A seed drill having, in (at least) two rows or arrays at least substantially transverse to its advance direction, multiple seed deposition assemblies, the or more advanced array or row being out of alignment with the or a more trailing array or row,
 - wherein each seed deposition assembly includes a concave disc, a bearing mounted to the disc on or from the concave side thereof and a mount into the bearing from the other disc side.
19. A drill of claim 18 wherein said mount into the bearing from the other side conforms at least in part to the convexity of the other side of the disc, the disc having been formed from a sheet material.

20. A drill of claim 18 or 19 wherein the mount is supported from a swinging arm.
21. A drill of any one of claims 18 to 20 wherein said mount includes a tubular extension which is journaled in a trailing region of a swinging arm, the swinging arm being adapted to pivot at a leading region thereof about a pivot axis normal to that to be provided between the mount and the swing arming.
22. A drill of claim 21 wherein the tubular extension is to beyond the actual or projected circular periphery of the disc.
23. A drill of claim 21 or 22 wherein said swing arm includes a dog leg which in use will have its elbow or knee upwardly.
24. A drill of any one of claims 20 to 23 wherein said swinging arm is adapted or is engaged to a compression system adapted to allow some resilient rising of the disc and its bearing/mount on the swinging arm.
25. A drill of any one of claims 21 to 23 wherein the tubular member journaled by the trailing region of the swinging arm leads into a chute that in use will be at least at or slightly in advance of the rotational axis to be provided by the bearing and the mount interengagement.
26. A drill of claim 25 wherein a cover is provided for the chute.
27. A drill of any one of claims 20 to 26 wherein the angular disposition of the mount relative to the swinging arm is adjustable.
28. A seed drill or seeder substantially as hereinafter described with reference to any one or more of the accompanying drawings.
29. A kit for retrofitting or for fitment to a seeder or seed drill so as to provide arrangements substantially as herein described as being aspects of the present invention.
30. A seeder having a hopper, conduits from the hopper (together with or without any singulation or like arrangement) when adapted to feed through seed deposition assemblies of any of the kinds hereinbefore defined and/or hereinafter described.
31. The use of apparatus in accordance with any one of claims 1 to 30 for the purpose of sowing seed.
32. Turf produced by a sowing procedure reliant upon apparatus of any one of claims 1 to 30.
33. Sown ground sown using an apparatus in accordance with any one of claims 1 to 30.